REMARKS

Favorable reconsideration of this application is requested in view of the following remarks.

Applicants respectfully request that the amendments to the specification and the claims in the Amendment and Response filed June 3, 2010 be entered with this request for continued examination.

In addition, claim 1 has been amended as supported by the specification at page 15, line 36 – page 16, line 19. No new issues are raised by the amendments to the claims.

Claims 1-4 and 7-11 have been rejected under 35 U.S.C. 103(a) as being unpatentable over Dinh-Nguyen et al. (U.K. Patent No. 1,103,607) or Junk et al. ("Preparative supercritical deuterium exchange in arenas and heteroarenes", Tetrahedron Letters, Vol. 37, No. 20, pp. 3445-3448, 1996) (Junk I) in view of Junk et al. (U.S. Patent No. 5,830,763) (Junk II) or Bergman et al. (U.S. Patent No. 6,794,522). Applicants respectfully traverse this rejection.

As discussed in the June 3, 2010 Amendment and Response, for the method of Dinh-Nguyen, deuterium peroxide (D_2O_2), which works as a promoter, is an essential solvent to obtain the high deuteration ratio such as over 99 % (see page 1, right coln., lines 54-58), i.e., without using D_2O_2, Dinh-Nguyen would not be able to provide the high deuteration ratio (see page 1, lines 17-37). D_2O_2, however, is excluded from the deuterated solvent of claim 1. Accordingly, claim 1 is distinguished from Dinh-Nguyen in this respect.

In addition, because D_2O_2 is the essential element for the method of Dinh-Nguyen to obtain the high deuteration ratio, there is no reasonable basis to combine Dinh-Nguyen with other references, such as Junk II and Bergman, and replace D_2O_2 with the deuterated solvent disclosed in such other references.

Junk I discloses use of supercritical deuterium exchange (SDE) and C_6D_6, both of which are excluded from the deuterated solvent of claim 1. In addition, Junk I discloses that by deuterating 1-methylnaphthalene with C_6D_6, deuterated isomers of 1-methylnaphthalene, i.e., deuterated 1-methylnaphthalene and deuterated 2-methylnaphthalene, were obtained, and that hydrogen atoms of the methyl group in the 1-methylnaphthalene and 2-methylnaphthalene were not deuterated (see scheme 1 on page 3446). In contrast, by the method of claim 1, hydrogen atoms of a methyl substituent of an aromatic ring are deuterated (see table 1 on page 29 of the specification). Moreover, it is known that C_6D_6 is a harmful compound to the environment and expensive, and thus would not be suitable for deuteration in an industrial scale.

Further, the Lewis catalyst ($EtAlCl_2$) used with C_6D_6 in Junk I is a highly flammable and highly reactive compound, and it is hazardous when contacting with water or air. Thus, Lewis catalyst also would not be suitable for an industrial production and deuteration of a substrate compound in an aqueous medium (see "Hazards" on pages 1-2 of Chemical Datasheet attached hereto).

Accordingly, claim 1 is distinguished from Junk I.

Junk II discloses a deuteration method of organic compounds using supercritical deuterium oxide (D_2O) as the reaction medium under a supercritical condition (see abstract and coln. 2, lines 63-65), which is excluded from claim 1, and Junk II does not remedy the deficiencies of Dinh-Nguyen and Junk I.

Bergman discloses a deuteration method of organic compounds using D_2O or a mixture of D_2O and CD_3CO_2D (see coln. 5, lines 24-28). As discussed above, for the method of Dinh-Nguyen, D_2O_2 is an essential element in order to obtain the high deuteration ratio (see page 1, left coln., lines 30-45), and thus there is no reasonable basis to combine Dinh-Nguyen with Bergman and replace D_2O_2 of Dinh-Nguyen with D_2O or a mixture of D_2O and CD_3CO_2D of Bergman. Accordingly, Bergman also does not remedy the deficiencies of Dinh-Nguyen and Junk I and II.

Accordingly, claim 1 and claims 2-4 and 7-11, which ultimately depend from claim 1, are distinguished from Dinh-Nguyen or Junk I in view of Junk II or Bergman, and this rejection should be withdrawn.

In view of the above, Applicants request reconsideration of the application in the form of a Notice of Allowance.

Respectfully submitted,

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52835
PATENT TRADEMARK OFFICE

Dated: July 1, 2010

By: _____
Douglas P. Mueller
Reg. No. 30,300

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ETHYL ALUMINUM DICHLORIDE

4
3

Chemical Identifiers | Hazards | Response Recommendations | Physical Properties | Regulatory Information | Alternate Chemical Names

Chemical Identifiers

What is this information?

UN/NA Number	CAS Number	CHRIS Code	DOT Hazard Label
none	563-43-9	EAD	data unavailable

NFPA 704: Red 4 -- Flammability: Extremely flammable
Yellow 3 -- Reactivity: Strong shock or heat may detonate - use monitors

General Description

A colorless to light-yellow heated liquid. Freezing point 90°F. (USCG, 1999)

Hazards

What is this information?

Reactivity Alerts

- Highly Flammable
- Strong Reducing Agent
- Water-Reactive
- Air-Reactive

Air & Water Reactions

Highly flammable. Ignites when exposed to air. Reacts violently with water or moisture in air forming hydrogen chloride fumes and flammable ethane gas (Rose 1961).

Fire Hazard

Special Hazards of Combustion Products: Intense smoke may cause metal-fume fever. Irritating hydrogen chloride also formed.

Behavior in Fire: Contact with water applied to adjacent fires will cause formation of irritating smoke containing aluminum oxide and hydrogen chloride. (USCG, 1999)

Health Hazard

Inhalation of smoke from fire causes metal-fume fever (flu-like symptoms); acid fumes irritate nose and throat. Contact with liquid (which is spontaneously flammable) causes severe burns of eyes and skin. (USCG, 1999)

Reactivity Profile

Organometallics, such as ETHYL ALUMINUM DICHLORIDE, are reactive with many other groups. Incompatible with acids and bases. Organometallics are good reducing agents and therefore incompatible with oxidizing agents. Often reactive with water to generate toxic or flammable gases. Organometallics containing halogens (fluorine, chlorine, bromine, iodine)

bonded to the metal typically with generate gaseous hydrohalic acids (HF, HCl, HBr, HI) with water.

Belongs to the Following Reactive Group(s)

- Organometallics

Response Recommendations

What is this information?

Firefighting

Fire Extinguishing Agents Not to Be Used: Water, foam, dry chemicals, halogenated agents, or carbon dioxide

Fire Extinguishing Agents: Inert dry powders such as dry graphite, soda ash, sand, limestone. (USCG, 1999)

Non-Fire Response

Neutralizing Agents for Acids and Caustics: Rinse with sodium bicarbonate or lime solution. (USCG, 1999)

Protective Clothing

Full protective clothing, preferably of aluminized glass cloth; goggles, face shield, gloves; in case of fire, all-purpose canister or self-contained breathing apparatus. (USCG, 1999)

First Aid

INHALATION: only fumes from fire need be considered; metal-fume fever is not critical and lasts less than 36 hrs.; irritation of nose and throat by acid vapors may require treatment by a physician.

EYES: flush gently with water for 15 min.; treat burns if fire occurred; get medical attention.

SKIN: wash with water; treat burns caused by fire; get medical attention. (USCG, 1999)

Physical Properties

What is this information?

Molecular Formula: C2H5AlCl2

Flash Point: data unavailable

Lower Explosive Limit: data unavailable

Upper Explosive Limit: data unavailable

Autoignition Temperature: Ignites spontaneously in air at ambient temperature. (USCG, 1999)

Melting Point: 90.0 ° F (USCG, 1999)

Vapor Pressure: data unavailable

Vapor Density: data unavailable

Specific Gravity: 1.227 at 95.0 ° F (USCG, 1999)

Boiling Point: 381.0 ° F at 760.0 mm Hg (USCG, 1999)

Molecular Weight: 130.0 (USCG, 1999)

Water Solubility: data unavailable

AEGL: data unavailable

ERPG: data unavailable

TEEL-1	TEEL-2	TEEL-3
9.41 mg/m3 (SCAPA, 2008)	9.41 mg/m3	9.41 mg/m3

IDLH: data unavailable

Regulatory Information

What is this information?

Regulatory Names: none
CAA RMP: Not a regulated chemical.
CERCLA: Not a regulated chemical.
EHS (EPCRA 302): Not a regulated chemical.
TRI (EPCRA 313): Not a regulated chemical.
RCRA Chemical Code: none

Alternate Chemical Names

What is this information?

- ALUMINUM (SOLUBLE SALTS AND ALKYLS, AS AL)
- ALUMINUM ETHYL DICHLORIDE
- EADC
- ETHYLALUMINUM DICHLORIDE